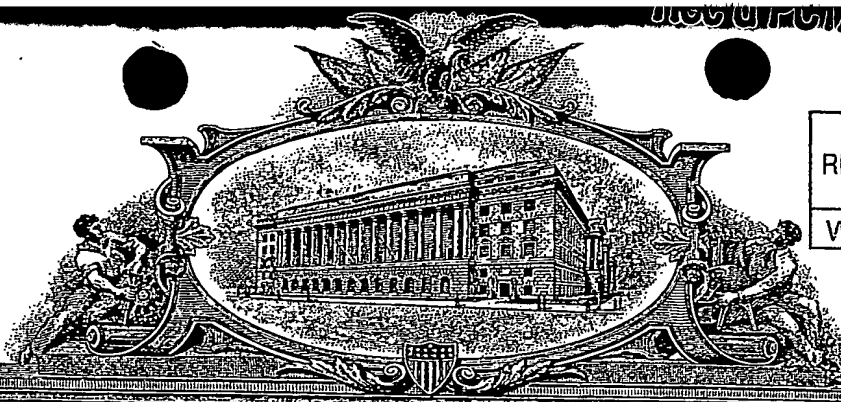


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This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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TITLE OF THE INVENTION (280 characters max)					
ENDOSCOPIC APPLIER WITH HIGH TORQUE JAWS					
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification		Number of Pages		20	
<input checked="" type="checkbox"/> Drawing(s)		Number of Sheets		5	
<input type="checkbox"/> Application Data Sheet, See 37 CFR 1.76		<input type="checkbox"/> CD(s), Number		<input type="text"/>	
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<input type="checkbox"/> No.					
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Respectfully submitted

SIGNATURE



Date 04 / 10 / 02

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26,439

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Frank J. Viola

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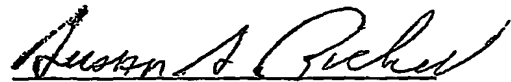
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ENDOSCOPIC APPLIER WITH HIGH TORQUE JAWS

BACKGROUND

1. Technical Field

The present disclosure relates to an apparatus for applying surgical clips to body tissue during open, laparoscopic or endoscopic procedures and, more particularly, to a surgical clip applier having jaws configured and adapted to withstand torsional forces acting thereon.

2. Background of Related Art

In laparoscopic and endoscopic surgical procedures, a small incision is made in the patient's body to provide access for a cannula device. Once extended into the patient's body, the cannula provides an access port which allows insertion of various surgical instruments, through the cannula, for acting on organs, blood vessels, ducts or body tissue that can be far removed from the incision. In many instances, several small incisions must be made in the patient's body in order to provide access of several instruments into the patient's body. Undoubtably, the more incisions required, the greater the trauma inflicted on the patient's body.

In surgical procedures, it is often necessary or desirable for a surgeon to grasp and/or blunt dissect in conjunction with applying surgical clips to a target area. Often, this requires the surgeon to make two incisions, one for the blunt dissection instrument and one for the endoscopic applier. However, recently, in order to reduce the trauma inflicted on the patient's body, surgeons have begun to perform blunt dissections using the distal end of an endoscopic

fastener or clip applier in order to perform the blunt dissection itself. In so doing, the surgeon eliminates the need to make extra incisions or to repeatedly, alternately insert the clip applier and then the blunt dissector.

When performing a blunt dissection, the distal end of a dissection instrument is used to separate or divide tissue by dividing the interconnecting membrane through repeated twisting and/or separating actions. For example, if the distal end of a surgical fastener or clip applier instrument with jaws were to be used for blunt dissection, the distal end of the jaws would be pressed into the interconnecting membrane and the jaws would then be opened and/or twisted, which opening and/or twisting would separate the interconnecting membrane. The procedure might be repeated as often as needed in order to fully separate the adjacent corporal bodies.

It is an object of the present disclosure to provide an apparatus for applying surgical fasteners or clips to body tissue during open, laparoscopic or endoscopic procedures.

It is another object of the present disclosure to provide an apparatus for applying a surgical fastener or clip that is used to manipulate and/or blunt dissect tissue prior or subsequent to applying fasteners or clips.

Another object of the present disclosure is to provide an apparatus for applying surgical fasteners or clips which has increased resistance to the loading (e.g., torsional, twisting, bending, etc.) effects experienced during grasping, manipulating and blunt dissecting techniques.

Another object of the present disclosure is to provide an apparatus for applying surgical fasteners or clips having a jaw configuration which is inherently resistant to distortion due to manipulation during grasping and blunt dissecting techniques.

A further object of the present disclosure is to provide a surgical fastener or clip applier that is easier to load with a fastener or clip and which makes forming the same easier.

A further object of the present disclosure is to provide an apparatus having coplanar jaws for applying a surgical clip, which jaws maintain their coplanarity.

A further object of the invention is to provide a surgical fastener or clip applier that has increased resistance to torsional forces and properly loads, forms and applies surgical fasteners or clips after having performed a blunt dissection procedure.

These objects together with other objects of the disclosure, along with the various features of novelty which characterize the disclosure, are pointed out with particularity in the claims annexed to and forming a part of this disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

By way of example only, preferred embodiments of the disclosure will be described with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a prior art apparatus for applying surgical clips in laparoscopic or endoscopic procedures;

FIG. 2 is an enlarged perspective view of the jaw mechanism of FIG. 1;

FIG. 3 is an enlarged perspective view, with portions broken away, of a distal end portion of a jaw mechanism according to the present disclosure;

FIG. 4 is an enlarged perspective view, with portions broken away, of a distal end portion of a jaw mechanism according to an alternative embodiment of the present disclosure; and

FIG. 5 is a top plan view, with portions broken away, of the distal end portion of the jaw mechanism shown in FIG. 4.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now in detail to the figures, in which like reference numerals identify similar or identical elements, FIG. 1 illustrates a typical prior art surgical fastener or clip applying instrument, here shown as surgical clip applier 10. Clip applier 10 includes a handle portion 12 having a movable handle 14 and a stationary hand grip 16, which serves to operate a jaw mechanism 20 through the provision of an elongated body portion 18. For example only, the junction at which the body portion 18 is joined to the handle portion 12 includes a rotation collar 22 for varying the orientation of the jaw mechanism 20 at the surgical site. Typical surgical clip applying instruments are described in commonly assigned U.S. Patent No. 5,607,436 to Pratt et al. and U.S. Patent No. 5,084,057 to Green et al., the entire disclosures of which are incorporated herein by reference.

FIG. 2 shows a jaw mechanism in the form of an integral jaw blade, generally 50, which at a distal end has a pair of coplanar jaws 52 in an open position for reception of a surgical clip therein. The basic objective of the jaw blade 50 is to bias surgical clips (not shown), after the jaws themselves have been positioned around an artery or blood vessel, by closing the jaws together thereby bringing together portions of the legs of a "U" or other appropriately shaped clip in order to sufficiently close the artery or blood vessel. Jaw blade 50 preferably is fabricated in one piece and preferably of a material having sufficient resilience such that clamping of jaws 52 toward each other to close a clip therebetween will be followed by a return of the jaws to their original position upon release of the clamping forces. Such a material can be comprised of a suitable metal, thermoplastic or thermoset or a combination thereof. It is understood that jaw blade 50 can be comprised of legs or members that are not monolithically formed, and that the legs need not be joined together at their proximal ends.

In a clamping procedure, jaws 52 are closed by the clamping forces imposed for example by distal movement of a tubular or other suitable member over the jaws. However, since each jaw 52 is located at the distal end of the blade 50 and is essentially independent of the other jaw, in a blunt dissection procedure using partly or fully open or closed jaws, a torsional force (i.e., a twisting force) and/or a bending force applied to the distal end of one or both jaws 52 may cause jaws 52 to come out of co-planar alignment with one another.

Turning now to FIGS. 3 and 4, a jaw blade, in accordance with the present disclosure, having inter-leg engaging members for reducing the effects of vertical deflection force acting on each leg of the jaw blade is disclosed. As described in greater detail below, the vertical deflection forces acting on each leg, whether the jaws are in an open or closed position, tend to cause the legs of the jaw blade to create a torque or a twisting about the longitudinal axis of the jaw blade. This torque can result in the legs of the jaw blade coming out of alignment and/or coplanarity with one another.

FIG. 3 shows the distal end portion of a jaw blade, generally designated 100, in accordance with the present disclosure for use in connection with a surgical clip applying instrument, for example, clip applier 10. Jaw blade 100 includes a first leg and a second leg, 102A and 102B respectively, each having a corresponding intermediate neck portion 106A and 106B, and a corresponding jaw 104A and 104B formed at a distal end of the leg and configured and adapted for receiving a surgical clip (not shown) therebetween. Jaw blade 100 further includes inter-leg engaging members preferably comprised of a pair of arms 108A and 108B axially spaced from one another and preferably extending from and between the inner surfaces of each respective neck portion (i.e., the surfaces of each respective neck portion which are oriented toward and substantially face one another) of respective neck portions 106A and 106B of jaw

blade 100. Each arm 108A and 108B includes a tongue 110A and 110B extending from the main portion of the arm. Tongues 110A and 110B are configured and adapted to engage or be engageable with a corresponding recess 112A and 112B formed preferably in a top surface of each neck portion 106A and 106B, at least when the jaws are in an assembled, less than full open position. Preferably, at least a portion of each tongue closely overlies a portion of a recess at least when the assembled jaws are fully open.

Further, as seen in FIG. 3, by way of example only, the ends of tongues 110A and 110B at the distal ends of arms 108A, 108B preferably are generally U-shaped and sized to be received in and mate with corresponding U-shaped side walls of recesses 112A and 112B. While generally "U" shaped tongues and recesses are shown, it is envisioned that any configuration and/or shape of tongue and recess can be provided. For example, the tongue need not be horizontally disposed but can be a vertical beam that extends from one neck portion and which fits snugly into a vertical recess formed in a corresponding surface of an other neck portion. The tongues and/or arms need not be identical, and the same applies to the recesses.

In a blunt dissection technique performed with a clip applier 10 having a jaw blade 100 according to the present disclosure, with no surgical clip in place, i.e., when jaws 104A, 104B are open, when a vertical deflecting force is applied in a direction "A" on the first jaw 104A, which force "A" tends to cause jaw 104A to deflect vertically upward, thereby causing the pair of jaws 104A and 104B to twist or bend about one another in a counter-clockwise direction, the floor of recess 112A formed in neck 106A will engage or abut against the corresponding juxtaposed surface of tongue 110B projecting from the corresponding arm 108B extending from second neck 106B, thereby preventing first jaw 104A from twisting about second jaw 104B. Likewise, when a force is applied in a direction "B", opposite to the direction "A", on the first

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jaw 104A, which force "B" tends to cause jaw 104A to deflect vertically downward, thereby causing the pair of jaws 104A and 104B to twist about one another in a clockwise direction, tongue 110A projecting from arm 108A extending from first neck 106A engages or abuts against recess 112B formed in neck 106B, thereby preventing first jaw 104A from twisting about second jaw 104B. It follows that, tongues 110A and 110B in cooperation with recesses 112B and 112A respectively will prevent vertical deflection forces acting directly on second jaw 104B from twisting second jaw 104B about first jaw 104A thereby preventing jaws 104A and 104B from becoming out of plane with one another. This can be especially advantageous when arms 102A and 102B are not joined at their proximal ends.

Jaw blade 100 according to the present disclosure preferably is fabricated of a material having sufficient resilience such that clamping of the pair of jaws 104A and 104B toward each other to close a clip therebetween will be followed by a return of the jaws 104A and 104B to their original position upon release of the clamping forces. However, unlike the prior art jaw blades, the jaw blade according to the present disclosure is less susceptible to the effects of torsional or bending forces acting thereon as a result of one or more inter-leg engaging members, here shown as a pair of arms 110A and 110B that extend preferably from corresponding neck portions 106A and 106B, respectively, and that interengage with opposite neck portions 106B and 106A, respectively, thereby reducing distortion.

FIGS. 4 and 5 show the distal end portion of an alternative jaw blade, generally designated 200, in accordance with the present disclosure for use in connection with the surgical clip applier 10. The distal end portion of jaw blade 200 includes a first leg and a second leg 202A and 202B each having a corresponding intermediate neck portion 206A, 206B, and a corresponding jaw 204A and 204B formed at a distal end thereof and configured and adapted for

receiving a surgical clip (not shown) therebetween. Neck portion 206A includes an arm 208 extending therefrom and oriented toward neck 206B, which arm 208 includes at its distal end an upper tongue and a lower tongue 210A and 210B, respectively, which together define a clevis 212 therebetween. Neck portion 206B includes upper and lower recesses 214A and 214B, respectively, formed along a top and a bottom surface thereof, which pair of recesses define a wall 216 therebetween. Wall 216 is configured and adapted to engage the walls that form clevis 212 of arm 208. In this manner, first jaw 204A is operatively coupled to second jaw 204B.

FIG. 5 is a top plan view of the distal end portion of jaw blade 200 after it is mounted in the distal end of a clip applier (not shown) while it is in an un-crimped or un-squeezed state (i.e., having jaws 204A and 204B in an open position, spaced apart from one another). As seen in FIG. 5, while jaws 204A, 204B are in the un-crimped state, arm 208 extends from neck portion 206A a distance sufficient for a portion of its upper tongue 210A to lap, here, to closely overlies, wall 216 and for a portion of its lower tongue 210B to lap, here, underlie, wall 216 at 220. In this manner, first jaw 204A is aligned or co-planar with second jaw 204B at all times from the spaced apart state through to the crimped or closed state. Moreover, by being already lapped, here, closely overlapped and underlapped at 220, while in the open or spaced apart state, jaws 204A and 204B do not have to be at all manipulated, e.g., moved to a more closed position prior to use in order for wall 216 to be aligned with and received in clevis 212.

Preferably the lower (or upper) surface of a tongue closely overlies (or underlies), and more preferably is slidably engaged with the upper (or lower) surface of the underlying (or overlying) recess, preferably when the applier is assembled and the jaws are in a fully open position. "Closely overlies (or underlies)" here means that the minimum gap of the tongue above (or below) the upper (or lower) surface of the recess is the normal manufacturing tolerance range

for the device. This can be from about 0.0005 inch to about 0.040 inch or more, the greater the gap, of course, the less effective the arm may be in preventing twisting of one jaw or leg relative to the other. The maximum gap in accordance with this invention is that gap at which, during blunt dissection, the tongue and recess surfaces will engage when a torque is applied to either jaw or leg.

In performing a blunt dissection technique with a clip applier 10 having a jaw blade 200 in accordance with the present disclosure, with assembled jaws 204A, 204B in a fully open position with no surgical clip in place, when a force is applied in a direction "A" on the first jaw 204A, which force "A" tends to cause the pair of jaws 204A and 204B to twist or bend about one another, the lower tongue 210B extending from the distal the end of arm 208 will abut against the top wall of lower recess 214B (bottom surface of wall 216) formed in neck portion 206B, thereby preventing the first jaw 204A from twisting or bending about the second jaw 204B. Likewise, when a force is applied in a direction "B", opposite to the direction "A", on the first jaw 204A, which force "B" tends to cause the pair of jaws 204A and 204B to twist about one another, upper tongue 210A extending from the distal end of arm 208 will abut against the floor of upper recess 214A (top surface of wall 216) formed in neck portion 206B, thereby preventing the first jaw 204A from twisting about the second jaw 204B. Thus, tongues 210A and 210B in cooperation with the recesses 214A and 214B will prevent forces acting directly on the second jaw 204B from twisting or bending the second jaw 204B about the first jaw 204A, thereby preventing the jaws 204A, 204B from coming out of plane with one another.

It is contemplated that jaw configurations in accordance with the present disclosure can be fabricated from any suitable biologically inert material including, but not limited to,

engineering plastics, stainless steel, titanium, shape memory alloys and spring steel as well as composites.

The high torque jaws according to the present disclosure can be incorporated in the assembly of new fastener or clip appliers or in the alternative can be a simple low cost modification to existing fastener or clip appliers wherein only the distal end of the jaws, legs of the blades, or the jaw blades, need to be replaced without the need to modify any other portion of the surgical instrument. Stated differently, the high torque jaws according to the present disclosure can be retrofitted into existing fastener or clip appliers.

Each of the above disclosed inter-leg engaging members preferably are configured to give the jaw blade a low profile. However, it is envisioned that various other inter-leg engaging members can be provided which tend to reduce the vertical deflection forces acting on each individual leg from causing the pair of legs or jaws from coming out of alignment with each other. For example, it is envisioned that the inter-leg engaging members can include a first arm having a proximal end fixedly secured to an upper surface of a neck or other portion of a first leg of a jaw blade, and a distal end overlying the upper surface of a neck or other portion of a second leg of the jaw blade, and a second arm having a proximal end fixedly secured to a lower surface of the neck or other portion of the first leg of the jaw blade and a distal end underlying the lower surface of the neck portion of the second leg of the jaw blade. In this manner, as one leg is deflected either vertically upward or downward, the first and the second arm cause the second leg to deflect vertically as well.

By way of a further example, it is envisioned that the inter-leg engaging members can include a first arm having a proximal end fixedly secured to an upper surface of a neck or other portion of a first leg of a jaw blade and a distal end overlying an upper surface of a neck or other

portion of a second leg of the jaw blade; and a second arm having a distal end fixedly secured to the upper face of a neck or other portion of the second leg of the jaw blade and a proximal end overlying the upper surface of the neck or other portion of the first leg of the jaw blade. In this manner, as one leg is deflected either vertically upward or downward, the first and the second arm cause the second leg to deflect vertically as well.

As a further example, each leg can have an inter-leg engaging member, e.g., an arm, extending therefrom and the arms can closely overlie and/or interengage each other, to achieve the objectives of the invention.

The arm(s) can be any suitable width or diameter and can extend from any portion along the length of the legs, neck or jaw portion of the blade so long as the arm(s) do not interfere with the feeding of the clips into and through the jaws. Generally speaking, the arm(s) are most effective when they are located as close to the distal tip of the jaws as possible, and are decreasingly effective the further they are removed from the distal tip of the jaws. Also generally speaking, to allow for visibility of a clip while seated in the jaw, the arm(s) desirably are located beyond the proximal end, e.g., the backspan, of the seated clip. Thus, for a seated 0.3 inch long clip, the arm(s) would desirably be positioned at least from about 0.3 inches to about 2.0 inches from the distal tip of the jaws.

Although the present disclosure is explained in reference to a clip applier, it is understood that the disclosure applies to apparatus for applying surgical fasteners or clips.

It is understood that various modifications may be made to the embodiments disclosed herein. For example, it is envisioned that the jaws according to the present disclosure can be thickened in the vertical direction, anywhere along the length of the jaws, in order to provide increased rigidity and resistance to vertical deflections. Therefore, the above description should

not be construed as limiting, but merely as an exemplification of preferred embodiments. Those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto.

2007-1552-04-1002

WHAT IS CLAIMED

1. A jaw blade for use in a surgical clip applier, comprising:
a first leg and a second leg, each leg having a jaw integrally connected thereto, and
an inter-leg engaging member that extends from one of said first and second legs and is
engageable with the other of said first and second legs.

2. The jaw blade of claim 1, wherein when said inter-leg engaging member is
engaged with the other of said first and second legs, a vertical displacement in a first direction of
one of said first and second legs causes a first corresponding displacement in said first direction
of said other of said first and second legs, and such that a vertical displacement in a second
direction, opposite said first direction, of said one of said first and second legs causes a second
corresponding displacement in said second direction of said other of said first and second legs.

3. The jaw blade of claim 1, wherein the jaw blade includes two inter-leg engaging
members, a first one that extends from said first leg and is engageable with said second leg, and a
second one that extends from said second leg and is engageable with said first leg.

4. The jaw blade of claim 3, wherein when said respective first and second inter-leg
engaging members are engaged with said respective second and first legs, a vertical displacement
in a first direction of one of said first and second legs causes a first corresponding displacement
in said first direction of said other of said first and second legs, and such that a vertical
displacement in a second direction, opposite said first direction, of said one of said first and

second legs causes a second corresponding displacement in said second direction of said other of said first and second legs.

5. The jaw blade of claim 4, wherein first inter-leg engaging member comprises a first arm, and said second inter-leg engaging member comprises a second arm.

6. The jaw blade of claim 1, wherein said first leg includes a first inner surface oriented toward said second leg and a recess formed in a lower portion of said first inner surface, said second leg includes a second inner surface oriented toward said first leg and a recess formed in an upper portion of said second inner surface, said first arm extends from said first inner surface of said first leg and includes a tongue extending distally therefrom, said tongue of said first arm being configured to be received in and be engaged with said recess in said second upper surface of said second leg; and said second arm extends from said second inner surface of said second leg and includes a tongue extending distally therefrom, said tongue extending from said second arm being configured to be received in and be engaged with said recess in said lower surface of said first leg.

7. The jaw blade of claim 1, wherein there are two inter-leg engaging members, one comprising a first arm that extends from said first leg and closely overlies and is engageable with said second leg, and the other comprising a second arm that extends from said first leg and closely underlies and is engageable with said second leg.

8. The jaw blade of claim 1, wherein said first leg includes a first arm that extends from said first leg toward said second leg, said first arm including a pair of transversely spaced apart tongues extending distally therefrom, said second leg including an upper and lower surface, an upper recess in said upper surface and a lower recess in said lower surface, and said pair of spaced apart tongues of said first arm are configured to be received in and be engageable with said upper and lower recesses formed respectively in said upper and lower surfaces of said second leg.

9. The jaw member of claim 1, wherein when said jaw member is assembled in a surgical clip applier and said jaws of said jaw member are in an open position, a portion of said inter-leg engaging member that extends from one of said first and second legs, closely overlies a portion of said other of said legs.

10. The jaw member of claim 3, wherein when said jaw member is assembled in a surgical clip applier and said jaws of said jaw member are in an open position, a portion of said inter-leg engaging member that extends from one of said first and second legs, slidingly engages a portion of said other of said legs.

11. The jaw member of claim 6, wherein a portion of said tongue of said first arm closely overlies said recess in said second upper surface of said second leg, and a portion of said tongue of said second arm closely underlies said recess in said first lower surface of said first leg.

12. The jaw member of claim 8, wherein said pair of spaced apart tongues of said first arm closely overlies and underlies said respective upper and lower recesses of said second leg.

13. The jaw blade of claim 1, wherein each of said first and second legs includes a neck adjacent said jaw of said respective first and second legs, and said inter-leg engaging member extends from one of said necks.

14. The jaw blade of claim 13, wherein there are two inter-leg engaging members, one that extends from said neck of said first leg, and another that extends from said neck of said second leg.

15. A jaw blade for use in a surgical clip applier, comprising:
a first leg and a second leg, each leg having a jaw integrally connected thereto, and
an inter-leg engaging member extending between and slidably engaged with the other of said first and second legs.

16. The jaw blade of claim 15, wherein when said inter-leg engaging member is slidably engaged with the other of said first and second legs, such that a vertical displacement in a first direction of one of said first and second legs causes a first corresponding displacement in said first direction of said other of said first and second legs, and such that a vertical displacement in a second direction, opposite said first direction, of said one of said first and second legs causes a second corresponding displacement in said second direction of said other of said first and second legs.

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17. The jaw blade of claim 15, wherein said first leg includes a first neck portion and said second leg includes a second neck portion, said first and second neck portions adjoining said first and second jaws, and said engaging member includes:

a first arm that extends from said first neck portion and slidingly engages said second neck portion, and

a second arm, spaced from said first arm, that extends from said second neck portion and slidingly engages said first neck portion.

18. The jaw blade according to claim 17, wherein said first neck portion includes an inner surface oriented toward said second neck portion and a recess formed in a lower portion of said inner surface, and said second neck portion includes an inner surface oriented toward said first neck portion and a recess formed in an upper portion thereof; said first arm extends from said inner surface of said first neck portion and includes a tongue extending distally therefrom, said tongue extending from said first neck portion being configured and adapted to be received in said recess formed in said upper surface of said second neck portion; and said second arm extends from said inner surface of said second neck portion and includes a tongue extending distally therefrom, said tongue extending from said second neck portion being configured and adapted to be received in said recess formed in said upper surface of said first neck portion, at least one of said first and second tongues being slidingly engaged with its respective recess.

19. The jaw blade according to claim 18, wherein said inter-leg engaging member comprises:

a first arm configured and adapted to extend from said first neck portion and overlie and slidingly engage said second neck portion, and

a second arm configured and adapted to extend from said first neck portion and underlie and slidingly engage said second neck portion.

20. The jaw blade according to claim 15, wherein said first neck portion includes an arm extending from said first neck portion substantially toward said second neck portion, said arm including a pair of transversely spaced apart tongues extending distally therefrom; wherein said second neck portion includes an upper and lower surface and an upper and a lower recess formed in said upper and lower surfaces thereof respectively, and wherein said pair of spaced apart tongues of said arm slidingly engage said upper and lower recesses formed in said upper and a lower surfaces of said second neck portion.

21. In an apparatus for applying surgical fasteners or clips including a handle portion, the apparatus including a body portion extending from the handle portion, a jaw mechanism extending from the body portion at an end opposite the handle portion and having a first leg and a second leg, each leg having a jaw mechanism integrally connected thereto, the jaw mechanisms being movable between an open position for receiving a fastener or clip and a closed position for forming a fastener or clip in response to a movement of the handle portion, and, a fastener or clip supply disposed within the body portion, the improvement in the jaw mechanism comprising:

an inter-leg engaging member extending between and being adapted to effect an engagement between said first and second legs, such that a vertical displacement in a first

direction of one of said first and second legs causes a first corresponding displacement in said first direction of said other of said first and second legs, and such that a vertical displacement in a second direction, opposite said first direction, of said one of said first and second legs causes a second corresponding displacement in said second direction of said other of said first and second legs.

22. The apparatus of claim 21, wherein said inter-leg engaging member is adapted to effect engagement when said jaws are in an open position.

23. The apparatus of claim 21, wherein said inter-leg engaging member is adapted to effect engagement when said jaws are in a closed position.

24. A method for applying surgical clips and performing blunt dissection of tissue, comprising the steps of:

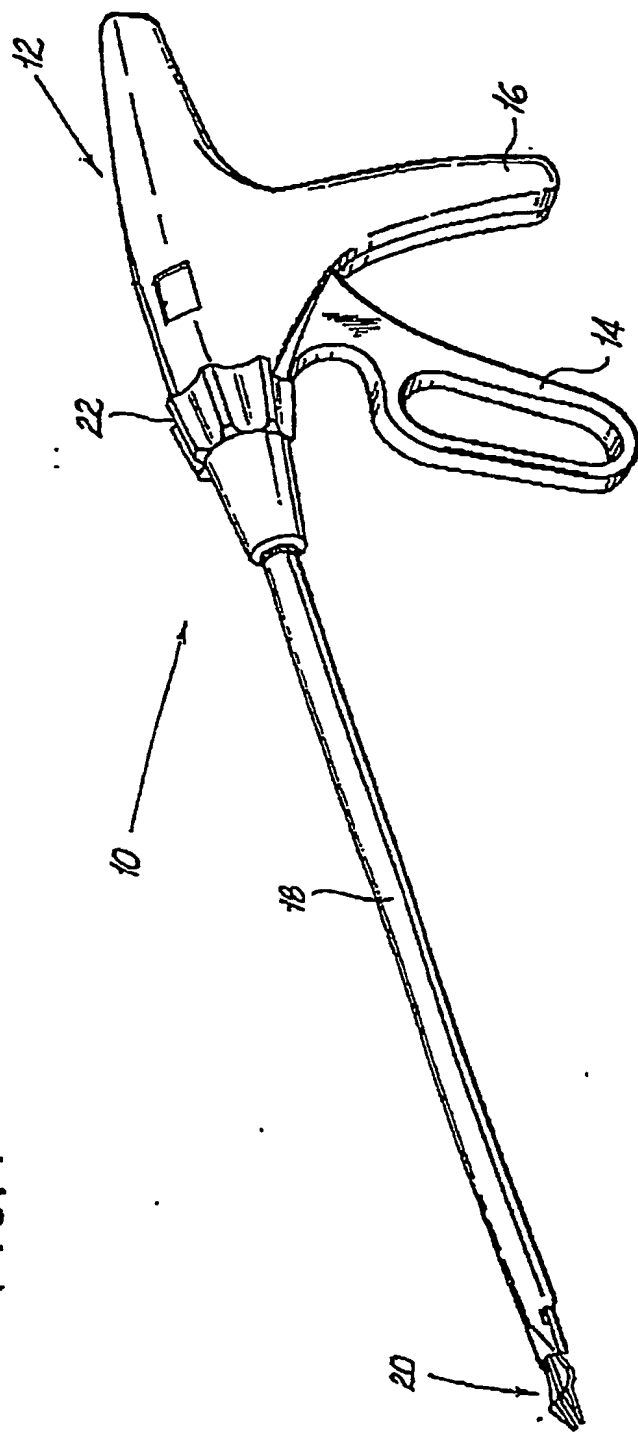
providing a surgical clip applier, which surgical clip applier includes a jaw blade having a first leg and a second leg, each leg having a jaw integrally connected thereto, and

an engaging member extending between and effecting an engagement between said first and second legs, such that a vertical displacement in a first direction of one of said first and second legs causes a first corresponding displacement in said first direction of said other of said first and second legs, and such that a vertical displacement in a second direction, opposite said first direction, of said one of said first and second legs causes a second corresponding displacement in said second direction of said other of said first and second legs,

performing a blunt dissection technique utilizing the jaws of said clip applier, and
applying a surgical clip to a tissue or vascular target area utilizing said clip applier.

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FIG. 1



(Prior Art)

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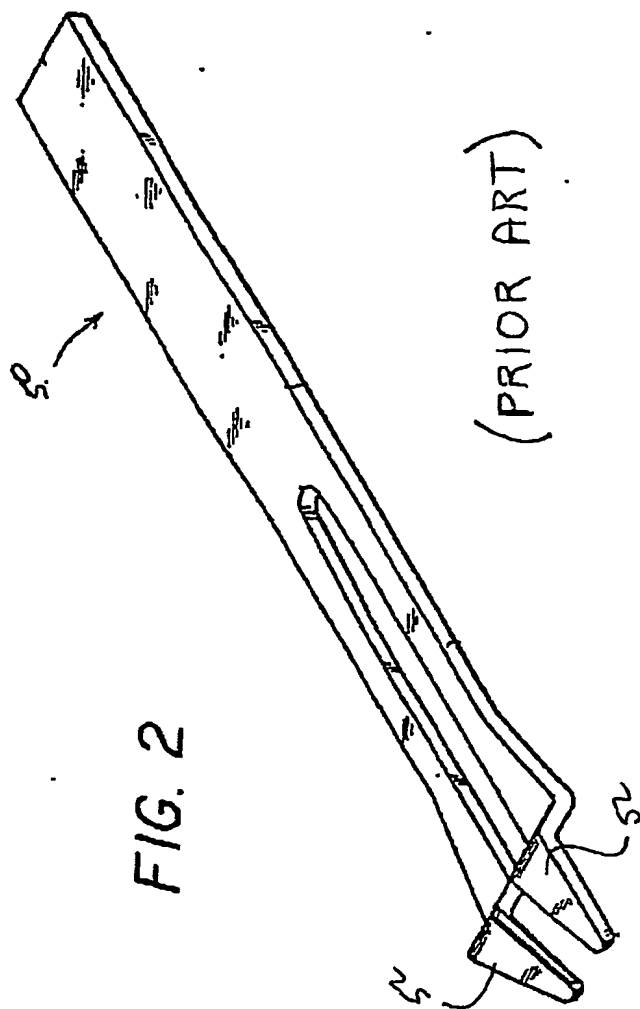
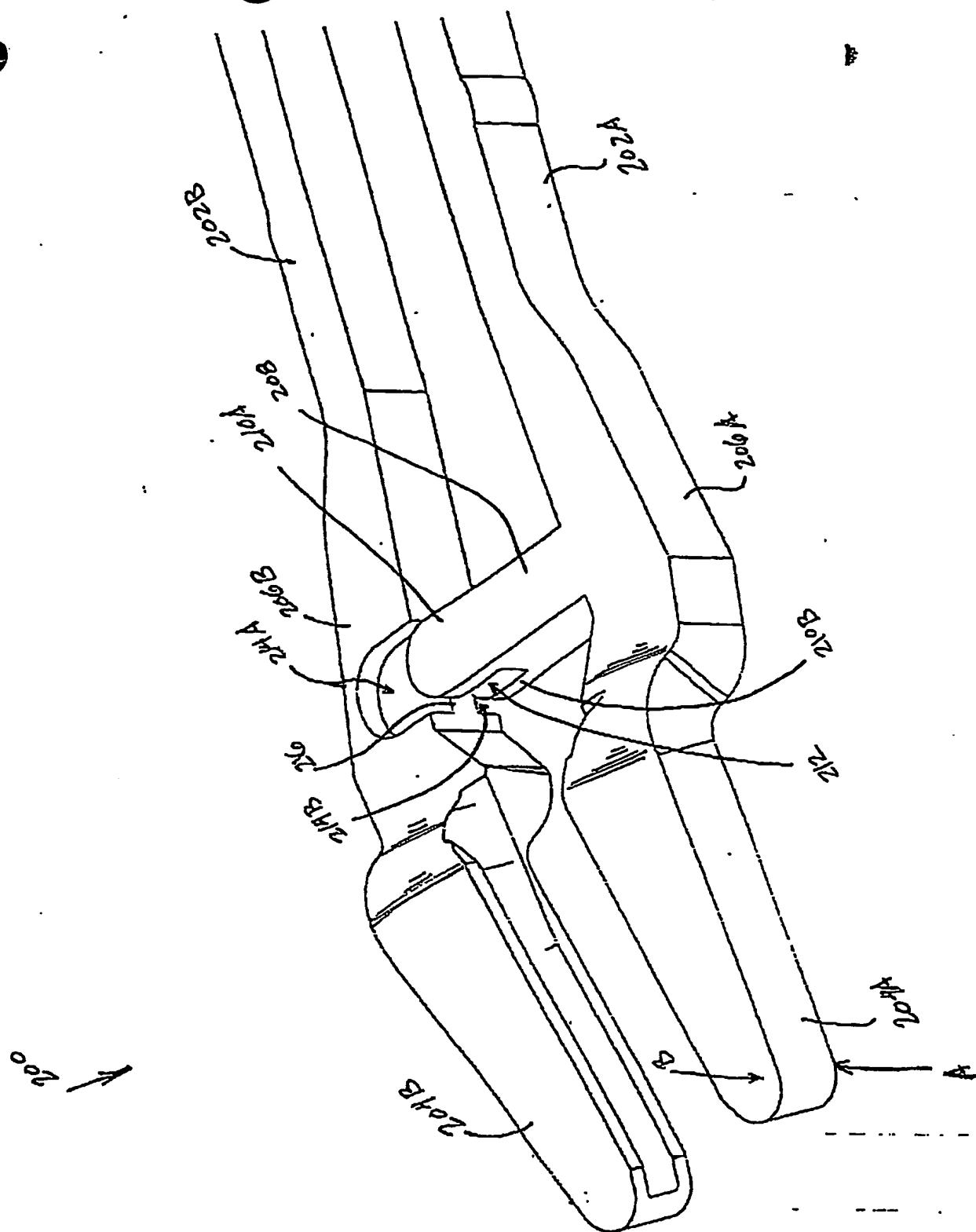




Fig. 3

4.
Ling



01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 10

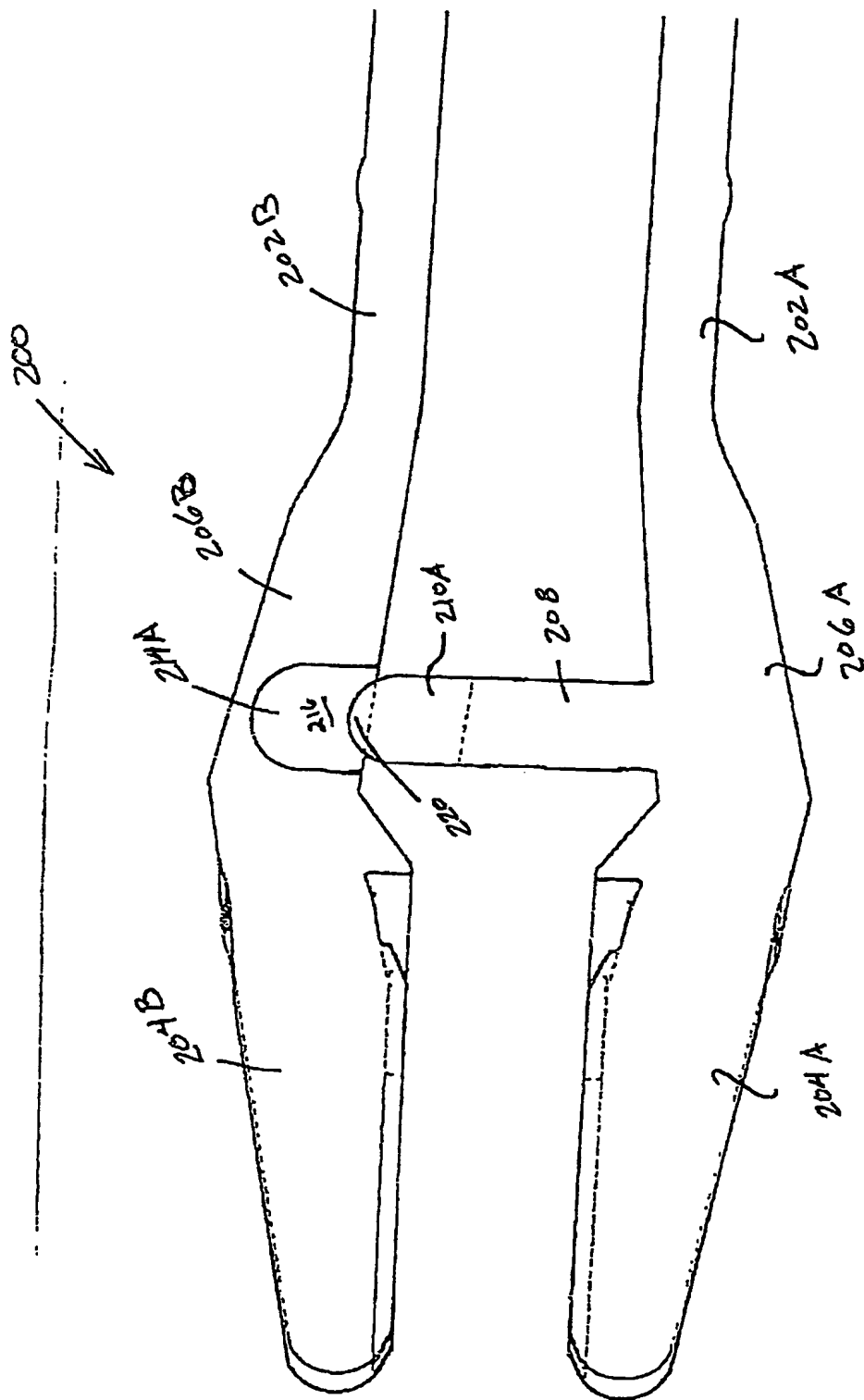


Fig. 5